Amendments to the Specification

Please replace the paragraph beginning at line 10 on page 1 with the following amended paragraph:

Magnetic disk drives are used to store and retrieve data for digital electronic apparatus such as computers. In Figures 1A and 1B, a magnetic disk data storage system 10 of the prior art includes a sealed enclosure 12, a disk drive motor 14, one or more magnetic disks 16, supported for rotation by a drive spindle 18 of motor 14, and an actuator 20 including at least one arm 22, the actuator being attached to a pivot bearing 24. Suspensions 26 are coupled to the ends of the arms 22, and each suspension supports at its distal end a read/write head 28. The head 28 (which will be described in greater detail with reference to Figures 2A and 2B) typically includes an inductive write element and a sensor read element. As the motor 14 rotates the magnetic disk 16, as indicated by the arrow R, an air bearing is formed under the transducer 28 causing it to lift slightly off of the surface of the magnetic disk 16, or, as [[its]] <u>it</u> is termed in the art, to "fly" above the magnetic disk 16. Various magnetic "tracks" of information can be written to and/or read from the magnetic disk 16 as the actuator 20 causes the head 28 to pivot in a short arc across a surface of the disk 16. The pivotal position of the actuator 20 is controlled by a voice coil 30, which passes between a set of magnets (not shown) to be driven by magnetic forces caused by current flowing through the voice coil 30.

Please replace the paragraph beginning at line 8 on page 2 with the following amended paragraph:

With reference still to Figure 2B, the yoke 38 includes the first magnetic pole 48 and a second magnetic pole 52. The first and second poles [[36]] <u>48</u>, 52 are joined at one end at what has been referred to as a back-gap 54. At the other end, the poles 48, 52 are separated by a write gap 56. A layer of write gap material 58 sits atop the first pole 48. The thickness of the write gap material layer 58 determines the thickness of the write gap 56, and it is formed so as not to cover the first pole at the back gap 54. A first insulation layer 60 sits atop the write gap material layer, and in addition to not covering the back-gap 54, is formed to leave a portion of the write gap material layer 58 uncovered near the ABS plane 50.

Please replace the 3 paragraphs beginning at line 8 on page 3, and running through line 7 of page 4, with the following 3 amended paragraphs:

In order to ensure that the mask 68 maintains adhesion to the seed layer 66, the wafer must be baked. This baking step has become more important as heads have become smaller in an effort to decrease track width, and increase data density. The baking step involves heating the wafer to a temperature of 120 to 130 degrees Celsius. While this post develop baking process, initially used to harden printing plate photoresist, a similar baking process has subsequently been used to improve the performance of Diazoquinone-novolak (DQN) photoresist. Post develop bake process involves the thermochemical (thermolysis) reactions of the resin, sensitizer, and residual solvents with heat and air. Post ~~deveop~~ develop bake removes most of the water molecules that are absorbed by the DQN photoresist films after developing and rinsing. With a baking temperature of 120 to 150 degrees Celsius, solvents and water molecules can be removed to ~~imporive~~ improve the bonding between photoresist and substrate. It also reduces side effects in post processes. Furthermore, thermal ~~stabiliztion~~ stabilization can be achieved with intermolecular reactions between sensitizer and the resin. Plastic flow may occur with increasing bake temperature as inter diffusion between a silyated surface primer and the photoresist. The plastic flow overcomes the surface adhesive force, surface tension and the internal modulus force of the photoresist. The photoresist profile starts to round at ~~corner~~ corners and eventually the photoresist starts to flow with increasing bake ~~termperature~~ temperature.

Unfortunately, as can be seen in Figures 2B and 2C, this baking step causes the photoresist to shrink, which results in a shallow wall angle 70 especially at the outermost turn of the coil pattern. This shallow wall angle results in a poorly defined coil 40 having a poorly defined, shallow wall angle at its outer edge 72 as can be seen in Figure 2B. This shallow wall angle at the outer edge 72 of the coil 40[[,]] not only results in poor coil definition, but also leads to poor topography of the later applied second insulation layer 64 and second pole 52 (Figure 2B). After the second pole has been constructed, the wafer is cut along line 74 (~~Figures 2B and~~ Figure 2C) to provide the ABS surface of plane 50 (Figure 2B).

Therefore there remains a need for a method for manufacturing a write element that prevents the shallow wall angle formation on the coil. The method would preferably involve as few additional process steps as possible and would also allow a post develop bake to be employed for mask processing purposes.

Please replace the paragraph beginning at line 16 on page 5 with the following amended paragraph:

The trenches formed in the coil mask advantageously provide stress relief so that when the mask shrinks during the baking process the side walls of the coil recess remain unaffected. The trench effectively breaks the tension created by the shrinkage, preventing the shrinkage from distorting the mask in the area of the coil pattern. This allows a well defined coil to be constructed with a beneficially vertical [[side-all]] side wall. The present invention avoids the shallow wall angle exhibited by the coil of the prior art without significantly adding to the cost of manufacturing the head.

Please replace the 3 paragraphs beginning at line 6 on page 8, and running through line 18 on page 9, with the following 3 amended paragraphs:

A second magnetic pole 330 is formed on top of the coil insulation layer and the first pole 314. The second pole 330 is preferably constructed of a high magnetic moment material such as $Ni_{45}Fe_{55}$, which can be deposited by electro-plating. Alternatively, the second pole can be formed of another high magnetic moment material and can be deposited by sputtering if the material cannot be plated. The second pole 330 has a pole tip 332, which is separated from the pole tip 316 of the first pole by the write gap material layer 320, thereby forming a write gap 334 ~~there between~~ therebetween. Opposite its pole tip 332, the second pole 330 connects with the first pole 314 in the back-gap region 318. Together the first and second poles 314, [[340]] 330 collectively form a magnetic yoke 336. When a current is caused to flow through the coil 322, a magnetic flux is induced in the yoke 336. This magnetic flux, being interrupted by the write gap 334, generates a magnetic field which fringes out from the write gap 334. This magnetic field is referred to in the art as a fringing field and can be used to impart magnetic data onto a disk 16 (Figures 1A, 1B) passing near the write gap 334.

With reference to Figure 4, a process 400 for constructing a head 300 having windings 324 with well defined vertically sloping side walls will be described. In a step 402, the first pole 314 is formed. The first pole 314 is preferably constructed of permalloy and is deposited by electroplating, however other magnetic materials and deposition methods can be used as well. The deposited first pole is then planarized using a ~~chemiemal~~ chemical mechanical polishing process

to produce a smooth flat upper surface. Then, in a step 404 a layer of dielectric write gap material is deposited. The write gap material layer is preferably Al_2O_3 and is sputter deposited. The write gap material layer is patterned using photolithography and etching as will be familiar to those skilled in the art to leave the back-gap portion [[310]] 318 of the first pole 314 uncovered. Thereafter, in a step 406 the first insulation layer 321 is deposited. The first insulation layer 321 is preferably constructed of photoresist, which is formed to leave the back-gap portion 318 of the first pole 314 uncovered as well as a portion of the write gap material 320 near the pole tip portion 316 of the first pole 314. The first insulation layer is formed by first exposing the photoresist in the desired pattern, and then lifting off the parts to be exposed.

Thereafter in a step 408, a thin, electrically conductive seed layer 500 is deposited. The seed layer, which can be more clearly understood with reference to Figure 5, is preferably a sputter deposited alloy containing chromium and copper, however it can be any suitable electrically conductive material. In a step 410 a coil mask layer 501 is deposited. The mask is preferably a photoresist material. In a step 412, a photolithographic process is used to form a coil recess 502 in the pattern of the coil 322, and also to form a series of buffer trenches 504 adjacent the outer edge of the coil pattern. The coil recess 502 and the buffer trenches 504 are shown in cross section in Figure 5. The coil recess 502 extends completely through the coil mask layer 500 to the coil seed layer ~~506 there under~~ 500 thereunder, which was previously deposited in step 408. The buffer trenches 504 do not extend entirely through the coil mask layer. The different depth of the trenches 504 as compared with the depth of the coil recess can be achieved by making the trenches 504 narrower than the coil insulation layer, and the depth of the trenches 504 can be controlled by controlling their width. Preferably, the depth of the trench is about 80% of the depth of the coil recess 502.

Please replace the paragraph beginning at line 27 on page 9, and running through line 6 on page 10, with the following amended paragraph:

Thereafter, in a step 416 the coil 322 is formed by electroplating. The coil 322 is preferably formed of an alloy of chromium and copper, and as will be appreciated by those skilled in the art, will only form at locations where the seed layer 500 is exposed. Therefore, the coil will only form in the coil recess [[504]] 502. In a step 418 the mask is lifted off leaving the coil 322. Thereafter, in a step 420 the coil insulation layer 328 is formed. The coil insulation layer [[322]] 328 is

formed by methods familiar to those skilled in the art, which include first spinning on a photoresist, then patterning the photoresist by photolithography and lifting off portions of the photoresist at the location of the back-gap 318 and pole tip 316. The coil insulation layer is then cured by exposing it to an elevated temperature which causes it to harden and to form smoothly tapered edges.

Please replace the paragraph beginning at line 11 on page 10 with the following amended paragraph:

Although the foregoing invention has been described in some detail for purposes of clarity of understanding, it will be apparent that certain changes and modifications may be practiced within the scope of the appended claims. For example, the write element could be constructed to have multiple coils. In addition, the first pole could be formed with a pedestal, constructed of a high magnetic moment material and could include a planarized first insulation layer having an upper surface that is flush with the upper surface of the pedestal. It is also contemplated that the present invention could be used [[with]] to construct a write element wherein the coil is not electroplated, but is deposited by some other method such as sputtering. Accordingly, the present embodiments are to be considered as illustrative and not restrictive, and the invention is not to be limited to the details given herein, but may be modified within the scope and equivalents of the appended claims.